

AMENDMENTS TO THE CLAIMS

The following is a complete listing of revised claims with a status identifier in parenthesis.

LISTING OF CLAIMS

1. (Currently Amended) A method of operating a nuclear reactor core, comprising:

operating a nuclear reactor core according to an initial operating plan developed in expectation of an in-cycle shut down;

selecting an in-cycle shut down time and developing a shuffling strategy to maximize energy generated by the reactor core;

shutting down the nuclear reactor core during a cycle at the selected in-cycle shutdown time; and

moving one or more fuel bundles of the nuclear reactor core to new positions within the nuclear reactor core based on the developed shuffling strategy to increase a total energy output of the nuclear reactor core as compared to continuing operation of the nuclear reactor core without the shutting down and moving steps.

2. (Canceled)

3. (Canceled)

4. (Canceled)

5. (Original) The method of claim 1, wherein

the shutting down step is performed at substantially mid-cycle.

6. (Original) The method of claim 1, further comprising:
removing one or more defective fuel bundles.

7. (Original) The method of claim 1, further comprising:
replacing one or more defective fuel bundles.

8. (Original) The method of claim 7, wherein the replacing step replaces
at least one defective fuel bundle with a fresh fuel bundle.

9. (Original) The method of claim 7, wherein the replacing step replaces
at least one defective fuel bundle with an exposed fuel bundle from a fuel pool.

10. (Original) The method of claim 1, further comprising:
replacing one or more fuel bundles.

11. (Original) The method of claim 10, wherein the replacing step
replaces at least one fuel bundle with a fresh fuel bundle.

12. (Original) The method of claim 10, wherein the replacing step
replaces at least one fuel bundle with an exposed fuel bundle from a fuel pool.

13. (Original) The method of claim 1, further comprising:

developing the initial operating plan in expectation of an in-cycle shutdown.

14. (Original) The method of claim 13, wherein the developing step comprises:

first simulating nuclear reactor operation for sets of independent control variable values to produce associated sets of dependent performance variable values;

generating polynomials based on the sets of independent control variable values and the sets of dependent performance variable values, the polynomials representing relationships between the independent control variables and the dependent performance variables;

generating additional sets of dependent performance variable values for additional sets of independent control variable values using the generated polynomials; and

determining a set of independent control variable values for possible use in operating a nuclear reactor based on the sets of dependent performance variable values and the additional sets of dependent performance variable values.

15. (Currently Amended) A method of operating a nuclear reactor core, comprising:

selecting an in-cycle shut down time and developing a shuffling strategy
to maximize the total revenue generated by the reactor core;

operating a nuclear reactor core according to an initial operating plan
developed in expectation of an in-cycle shut down;

shutting down [[a]] the nuclear reactor core during a cycle at the selected
in-cycle shutdown time; and

moving one or more fuel bundles of the nuclear reactor core to new
positions within the reactor core based on the developing shuffling strategy to
increase a total revenue generated from the energy produced by the reactor
core as compared to continuing operation of the reactor core without the
shutting down and moving steps.

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (New) The method of claim 15, further comprising:
replacing one or more defective fuel bundles.

20. (New) The method of claim 19, wherein the replacing step replaces at
least one defective fuel bundle with a fresh fuel bundle.

21. (New) The method of claim 19, wherein the replacing step replaces at
least one defective fuel bundle with an exposed fuel bundle from a fuel pool.

22. (New) The method of claim 15, further comprising:
replacing one or more fuel bundles.

23. (New) The method of claim 22, wherein the replacing step replaces at least one fuel bundle with a fresh fuel bundle.

24. (New) The method of claim 22, wherein the replacing step replaces at least one fuel bundle with an exposed fuel bundle from a fuel pool.

25. (New) The method of claim 15, further comprising:
developing the initial operating plan in expectation of an in-cycle shutdown.

26. (New) The method of claim 25, wherein the developing step comprises:

first simulating nuclear reactor operation for sets of independent control variable values to produce associated sets of dependent performance variable values;

generating polynomials based on the sets of independent control variable values and the sets of dependent performance variable values, the polynomials representing relationships between the independent control variables and the dependent performance variables;

generating additional sets of dependent performance variable values for additional sets of independent control variable values using the generated polynomials; and

determining a set of independent control variable values for possible use in operating a nuclear reactor based on the sets of dependent performance variable values and the additional sets of dependent performance variable values.

27. (New) A method of operating a nuclear reactor core, comprising:
operating a nuclear reactor core according to an initial operating plan developed in expectation of an in-cycle shut down;
shutting down the nuclear reactor core during a cycle;
moving one or more fuel bundles of the nuclear reactor core to new positions within the nuclear reactor core to increase a total energy output of the nuclear reactor core as compared to continuing operation of the nuclear reactor core without the shutting down and moving steps; and
the shutting down step is performed at substantially mid-cycle.

28. (New) A method of operating a nuclear reactor core, comprising:
operating a nuclear reactor core according to an initial operating plan developed in expectation of an in-cycle shut down;
shutting down the nuclear reactor core during a cycle;

moving one or more fuel bundles of the nuclear reactor core to new positions within the reactor core to increase a total revenue generated from the energy produced by the reactor core as compared to continuing operation of the reactor core without the shutting down and moving steps; and
the shutting down step is performed at substantially mid-cycle.

29. (New) A method of operating a nuclear reactor core, comprising:
operating a nuclear reactor core according to an initial operating plan developed in expectation of an in-cycle shut down;
shutting down the nuclear reactor core during a cycle;
moving one or more fuel bundles of the nuclear reactor core to new positions within the nuclear reactor core to increase a total energy output of the nuclear reactor core as compared to continuing operation of the nuclear reactor core without the shutting down and moving steps; and
removing one or more defective fuel bundles.

30. (New) A method of operating a nuclear reactor core, comprising:
operating a nuclear reactor core according to an initial operating plan developed in expectation of an in-cycle shut down;
shutting down the nuclear reactor core during a cycle;
moving one or more fuel bundles of the nuclear reactor core to new positions within the reactor core to increase a total revenue generated from the

energy produced by the reactor core as compared to continuing operation of the reactor core without the shutting down and moving steps; and
removing one or more defective fuel bundles.